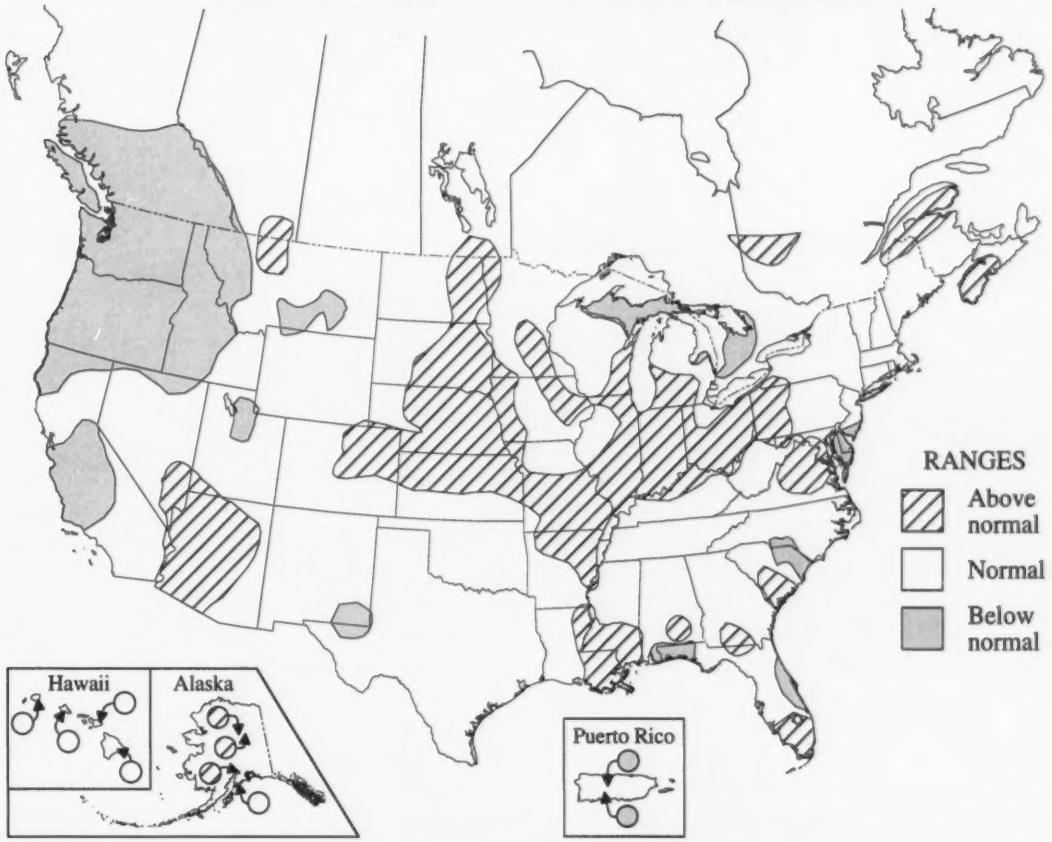
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

NOVEMBER 1993

STREAMFLOW DURING NOVEMBER



Runoff from heavy rains on November 13-15 caused flooding in southern Missouri, southern Illinois, and south-central Indiana. Rainfall amounts for the period ranged from 3 to 12 inches. Several gaging stations recorded peak discharge with a recurrence interval of 100 years or greater. The gaging station on Big Creek at Des Arc, Missouri, was destroyed by the flood. Parts of several towns in Indiana were evacuated and many highways were closed due to the high water including parts of Highway 37, the main route connecting Indianapolis and Bloomington, Indiana.

In contrast, streamflow in the Northwest and northern California was much below normal. Three index stations in that area had November mean monthly flows of less than 10 percent of median November flows. Rainfall records from the National Climate Data Center, National Oceanic and Atmospheric Administration, show November 1993 as the 5th driest November on record since 1895 in Washington and the 8th driest in Oregon.

The combined flow of the three largest rivers in the lower 48 States—the Mississippi, St. Lawrence, and Columbia Rivers—remained in the above-normal range for the 16th consecutive month. Combined flow in November was 28 percent above the median despite a 14 percent decrease from October.

Monthend index reservoir contents were in the below-average range at 22 of 100 reporting sites compared with 31 of 100 at the end of November 1992. Contents were in the above-average range at 46 sites compared with 47 a year ago. Reservoirs in California show a marked increase in contents in November 1993 from November 1992.

Mean November elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range and above median on Lakes Superior, Huron, and Erie and below normal on Lake Ontario.

Utah's Great Salt Lake declined 0.1 foot during November ending the month at 4,200.6 feet above National Geodetic Vertical Datum. Lake level was 0.9 foot higher than at the end of November 1992 and 11.25 feet lower than the maximum of record.

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Reporting of ground-water conditions will resume with the June 1994 edition.

SURFACE-WATER CONDITIONS DURING NOVEMBER 1993

Runoff from heavy rains on November 13 through 15 caused flooding in southern Missouri, southern Illinois, and south-central Indiana. In Missouri, rainfall amounts varied from 3 to 8 inches. New peaks of record were recorded at 11 gaging stations, five of which have records dating back to before 1930. Three stations recorded peak discharges with a recurrence interval of 100 years or greater: St. Francis River near Patterson, Current River at Doniphan, and Jacks Fork at Eminence. The gaging station on Big Creek at Des Arc was destroyed by the flood. The index station on the Gascanade River at Jerome recorded mean monthly flow of 10,300 cubic feet per second (cfs), which was 807 percent of median flow for November and a new record maximum for the month.

Rainfall amounts varied from 6 to 12 inches in southern Illinois. The most significant peak flow was at Rayse Creek near Waltonville. A peak discharge of 20,800 cfs was recorded on November 14. This discharge has a recurrence interval of over 100 years. Four other stations had peak discharges with an approximate 50 year recurrence interval. The index gaging station on the Wabash River at Mount Carmel recorded a mean monthly flow of 87,500 cfs, which was 709 percent of median flow of November and a new record maximum for the month.

In Indiana, extensive flooding occurred throughout the central and southern parts of the State. Evacuations were necessary in several towns and many highways were closed due to the high water including parts of Highway 37, the main route connecting Indianapolis and Bloomington. Rainfall amounts ranged from 4 to 8 inches, with 6.13 inches being recorded in Indianapolis. The index station on the East Fork White River at Shoals, recorded a mean monthly flow of 18,200 cfs, which was 947 percent of the November median and a new record maximum for November. The gage on the White River at Newberry recorded a peak flow of 106,000 cfs, which had a recurrence interval of about 100 years.

In contrast, streamflow in the Northwest and northern California was much-below normal. The November mean monthly flow at the index station on Smith River near Crescent City, California, was only 273 cfs, which was 6 percent of median and the third lowest on record. The flow at Wilson River near Tillsmook, Oregon was 100 cfs, 6 percent of median and the second lowest on record, and the flow at Chehalis River near Grand Mound, Washington was 276 cfs, 9 percent of median and the third lowest November flow on record. Rainfall records from the National Climatic Data Center, National Oceanic and Atomspheric Administration, show November 1993 as the 5th driest November in a period since 1895 in Washington and the 8th driest in Oregon.

Below-normal streamflow occurred in 15 percent of the area of the conterminous United States and southern Canada during November, the same as in October. Above-

NEW MAXIMUMS DURING NOVEMBER 1993 AT STREAMFLOW INDEX STATIONS

Station number	Stream and place of determination	Drainage area (square miles)	Previous November maximums (period of record) Years of record	Monthly mean in cfs (year)	Daily mean in cfs (year)	November 1993 Monthly mean in cfs	Percent of median	Daily mean in cfs	Day
01645000	Seneca Creek at Dawsonville, Maryland	101	62	238 (1971)	2,110 (1952)	289	416	6,220	28
03377500	Wabash River at Mount Carmel, Illinois	28,635	65	63,533 (1985)	144,000 (1985)	87,460	709	197,000	22
03373500	East Fork Wite River at Shoals, Indiana	4,927	79	13,396 (1985)	31,900 (1979)	18,150	947	49,800	22
06933500	Gasconade River at Jerome, Missouri	2,840	...	10,124 (1983)	39,800 (1985)	10,290	807	58,200	16
15290000	Little Susitna River near Palmer, Alaska	61.9	44	134 (1979)	320 (1979)	174	281	673	30
15514000	Chena River at Fairbanks, Alaska	1,980	44	1,018 (1971)	1,300 (1972)	1,310	239	1,700	9

normal range streamflow occurred in 21 percent of this area, compared with 28 percent in October.

In addition to the three index stations mentioned above, new extremes, all maximums, were set at Seneca Creek at Dawsonville, Maryland, Little Susitna River near Palmer, Alaska, and Chena River at Fairbanks, Alaska. Hydrographs for all six stations with new maximum monthly mean flows for November are on page 4.

The combined flow of the three largest rivers in the lower 48 States—the Mississippi, St. Lawrence, and Columbia Rivers—despite a decrease in flow of 14 percent, from October remained in the above-normal range. Combined flow was 962,000 cfs, which was 28 percent above the median and has been above-normal for 16 consecutive months. Flow of the St. Lawrence decreased by 3 percent from last month and was in the normal range. Flow of the Mississippi River at Vicksburg decreased by 14 percent from October, but was still 173 percent of the median flow and in the above-normal range for the fifth consecutive month. Flow in the Columbia River was only 60 percent of median following a decrease of 23 percent from last month and in the below-normal range for the third consecutive month.

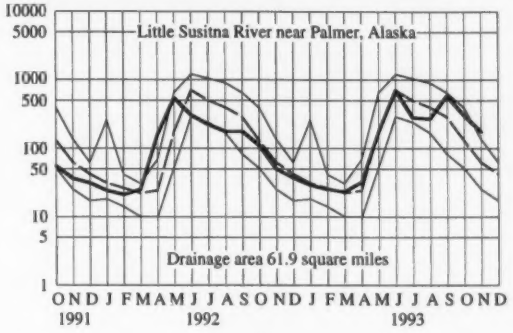
Monthend index reservoir contents were in the below-average range at 22 of 100 reporting sites compared with 31 of 100 at the end of November 1992. Contents were in the above-average range at 46 sites compared with 47 a year ago. Reservoirs were below average in Montana, Idaho, Washington, Nevada, Lake Tahoe in California-Nevada, Bear Lake in Utah-Idaho, parts of Texas, New Jersey, and Massachusetts. Reservoirs were above average in Nova Scotia and Quebec, Canada, most of New England, Pennsylvania, Maryland, South Carolina, Georgia, South Dakota, Wyoming, Colorado, California, New Mexico, Arizona, and Lakes Mead and Mohave in Arizona-Nevada. The reservoirs in California show a marked increase in contents in November 1993 over November 1992. Clair Engle Lake was at 78 percent of normal maximum as compared to 27 percent last year. Hetch Hetchy Reservoir was at 77 percent of normal maximum compared to 43 percent last year. International Falcon Reservoir in Texas showed a decline from 97 percent of normal maximum in November 1992 to only 63 percent of normal maximum this year. Keystone Reservoir in Oklahoma had a similar decline from 147 percent of normal maximum last year to 81 percent this year.

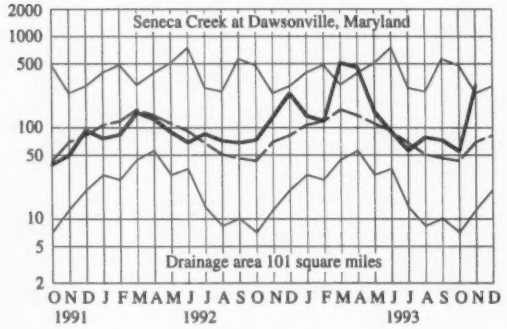
Mean November elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range and above median on Lakes Superior, Huron, and Erie and below normal on Lake Ontario. Lake levels fell seasonally at all four gages.

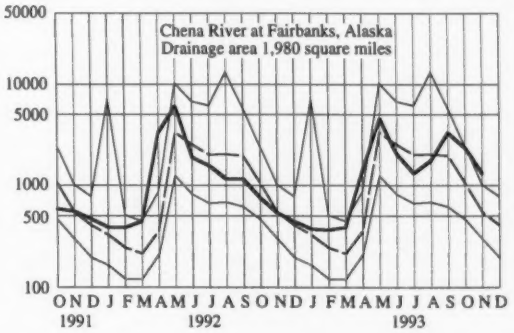
Utah's Great Salt Lake level declined 0.1 foot during November with minor fluctuations ending the month of 4,200.6 feet above National Geodetic Vertical Datum. Lake level on November 30 was 0.9 foot higher than at the end of November 1992 and 11.25 feet lower than the maximum of record, which occurred in June 1986 and March-April 1987.

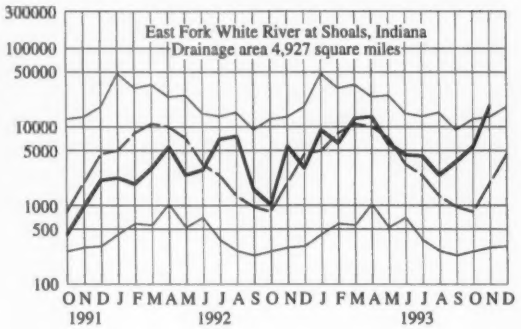
MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

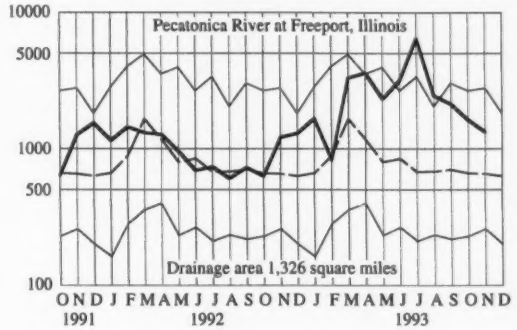
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period 1961-90. Heavy line indicates mean for current period.

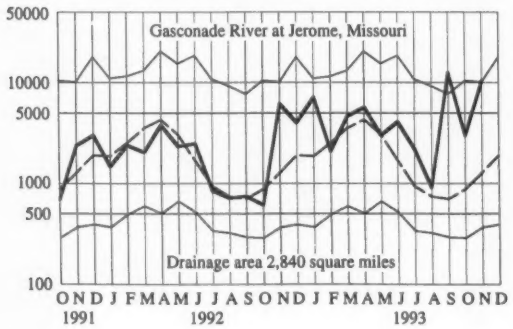


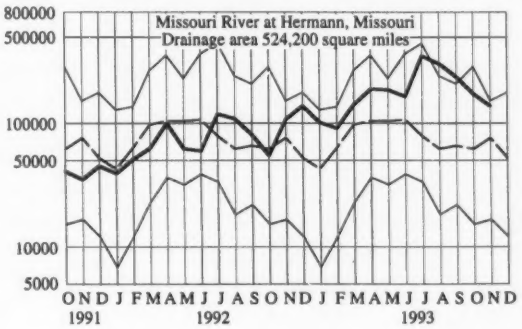










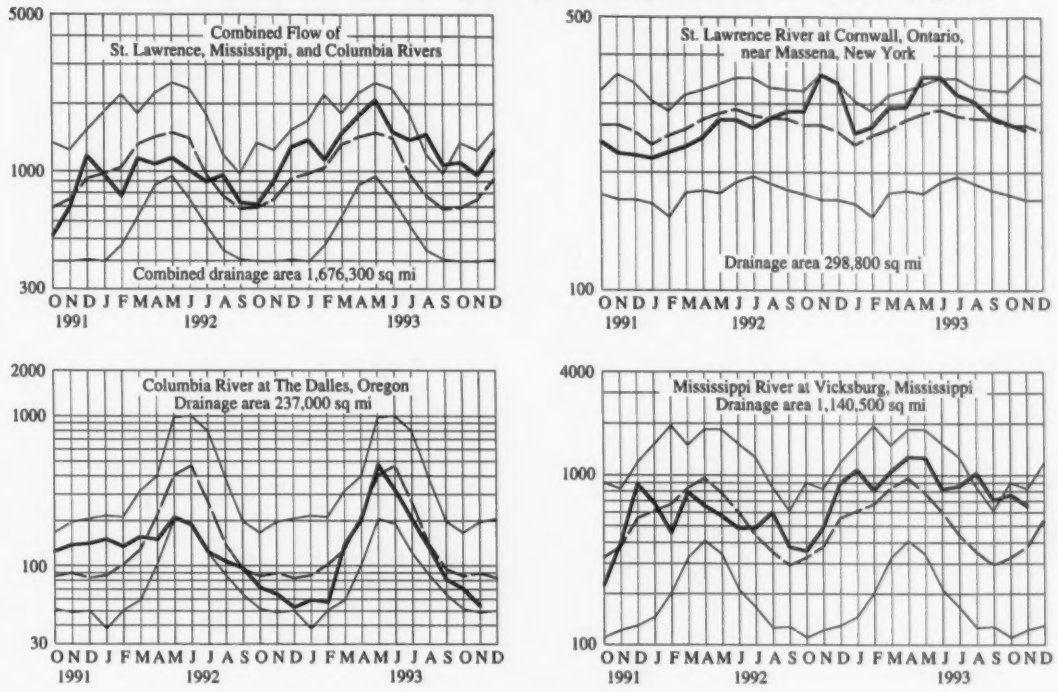


DISCHARGE, IN CUBIC FEET PER SECOND

HYDROGRAPHS FOR THE "BIG THREE" RIVERS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period 1961-90. Heavy line indicates mean for current period.

DISCHARGE, IN THOUSAND CUBIC FEET PER SECOND



Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES FOR NOVEMBER 1993 AT DOWNSTREAM SITES ON TWO LARGE RIVERS

Station number	Station name	November data of following calendar years	Stream discharge during month	Dissolved-solids concentration [1]		Dissolved-solids discharge [1]			Water temperature [2]		
			Mean (ft^3/s)	Minimum (mg/L)	Maximum (mg/L)	Mean	Minimum	Maximum	Mean (°C)	Minimum (°C)	Maximum (°C)
						(tons per day)					
01463500	Delaware River at Trenton,	1993	2,984	70	118	100	1,701	11,436	7.5	5.0	10.0
	New Jersey, (Morrisville,	1945-92	10,740	55	151	[3]3,123	469	12,300	[3]8.0	2.0	19.0
	Pennsylvania)	(Extreme yr)		(1955)	(1964)		(1963)	(1972)			
			[4]9,196								
06934500	Missouri River at Hermann,	1993	138,200	301	340	116,100	92,100	240,000	10.0	10.0	11.0
	Missouri. (60 miles west of	1976-92	83,820	204	516	80,870	29,900	246,000	9.0	3.5	16.0
	St. Louis, Missouri)	(Extreme yr)		(1985)	(1987)		(1990)	(1985)			
			[4]76,220								

[1]Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.
[2]To convert °C to °F: [(1.8 x °C) + 32] = °F.
[3]Mean for 8-year period (1983-91).
[4]Median of monthly values for 30-year reference period, water years 1961-90, for comparison with data for current month.

Provisional data; subject to revision

FLOW OF LARGE RIVERS DURING NOVEMBER 1993

Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September 1991 (cubic feet per second)	November 1993					
				Monthly mean discharge (cubic feet per second)	Percent of median monthly discharge 1961–90	Change in discharge from previous month (percent)	Discharge near end of month		
							Cubic feet per second	Million gallons per day	Date
01014000	St. John River below Fish River at Fort Kent, Maine	5,665	9,693	* 11,890	167	8	13,200	8,530	30
01318500	Hudson River at Hadley, New York	1,664	2,925	2,230	88	62	6,800	4,390	30
01357500	Mohawk River at Cohoes, New York	3,456	5,673	6,250	120	145	13,800	8,920	30
01463500	Delaware River at Trenton, New Jersey	6,780	11,660	11,800	128	114	53,300	34,400	30
01570500	Susquehanna River at Harrisburg, Pennsylvania	24,100	34,200	39,430	157	264	209,000	135,000	30
01646500	Potomac River near Washington, District of Columbia	11,560	[1]11,070	* [1]10,700	210	270	...	...	...
02105500	Cape Fear River at William O. Huske Lock, near Tarheel, North Carolina.	4,852	4,933	2,570	147	134	...	...	...
02131000	Pee Dee River at Peedee, South Carolina	8,830	9,903	† 3,751	69	15	6,180	3,990	30
02226000	Altamaha River at Doctortown, Georgia	13,600	13,570	4,710	105	103	4,120	2,660	30
02320500	Suwannee River at Branford, Florida	7,880	7,038	2,718	86	30	...	...	...
02358000	Apalachicola River at Chattahoochee, Florida	17,200	22,137	13,490	115	28	...	...	...
02467000	Tombigbee River at Demopolis lock and dam, near Coatopa, Alabama.	15,385	23,700	7,450	92	210	5,750	3,720	30
02489500	Pearl River near Bogalusa, Louisiana	6,573	10,102	* 12,920	416	476	7,080	4,580	30
03049500	Allegheny River at Natrona, Pennsylvania	11,410	[1]19,690	* [1]32,730	191	192	57,700	37,300	30
03085000	Monongahela River at Braddock, Pennsylvania	7,337	[1]12,540	* [1]14,990	164	195	24,600	15,900	30
03193000	Kanawha River at Kanawha Falls, West Virginia	8,367	12,550	9,554	100	202	18,500	12,000	30
03234500	Scioto River at Higby, Ohio	5,131	4,654	* 5,709	302	640	9,000	5,800	30
03294500	Ohio River at Louisville, Kentucky[2]	91,170	115,900	* 151,000	226	194	189,000	122,000	30
03377500	Wabash River at Mount Carmel, Illinois	28,635	27,880	* 87,460	709	141	103,000	66,600	30
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wisconsin[2]	6,010	4,248	* 5,890	145	11	5,360	3,460	30
04264331	St. Lawrence River at Cornwall, Ontario, near Massena, New York[3]	298,800	245,300	257,000	97	–4	251,000	162,000	30
02NG001	St. Maurice River at Grand Mere, Quebec	16,300	[1]24,290	...	...	...	...	...	...
05082500	Red River of the North at Grand Forks, North Dakota	30,100	2,565	* 2,109	122	–43	1,760	1,140	30
05133500	Rainy River at Manitou Rapids, Minnesota	19,400	9,036	12,610	127	0	10,800	6,980	30
05330000	Minnesota River near Jordan, Minnesota	16,200	7,062	* 4,852	356	–25	3,900	2,520	30
05331000	Mississippi River at St. Paul, Minnesota	36,800	[1]15,890	[1]13,780	202	–9	9,500	6,140	30
05365500	Chippewa River at Chippewa Falls, Wisconsin	5,650	5,072	3,330	79	6	3,200	2,070	30
05407000	Wisconsin River at Muscoda, Wisconsin	10,400	8,666	8,450	109	3	7,920	5,120	30
05446500	Rock River near Joslin, Illinois	9,549	6,161	6,686	134	–25	7,150	4,620	30
05474500	Mississippi River at Keokuk, Iowa	119,000	64,070	68,350	124	–26	69,600	45,000	30
06214500	Yellowstone River at Billings, Montana	11,795	6,965	† 3,190	80	–23	3,420	2,210	30
06934500	Missouri River at Hermann, Missouri	524,200	76,940	* 138,200	181	–20	110,000	71,000	30
07289000	Mississippi River at Vicksburg, Mississippi[4]	1,140,500	583,000	* 651,300	173	–14	1,020,000	660,000	30
07331000	Washita River near Dickson, Oklahoma	7,202	1,584	757	108	24	832	537	30
08276500	Rio Grande below Taos Junction Bridge, near Taos, New Mexico.	9,730	757	525	95	36	490	316	30
09315000	Green River at Green River, Utah	44,850	6,292	3,565	100	31	...	...	...
11425500	Sacramento River at Verona, California	21,251	18,810	11,060	85	–10	...	...	...
13269000	Snake River at Weiser, Idaho	69,200	18,220	† 12,300	80	–4	13,100	8,470	30
13317000	Salmon River at White Bird, Idaho	13,550	11,160	† 3,810	73	–16	4,020	2,600	30
13342500	Clearwater River at Spalding, Idaho	9,570	15,290	† 2,670	49	–12	3,950	2,550	30
14105700	Columbia River at The Dalles, Oregon[5]	237,000	[1]192,200	† [1]53,970	60	–23	119,000	77,200	30
14191000	Willamette River at Salem, Oregon	7,280	[1]23,400	† [1]4,116	15	8	6,630	4,280	30
15515500	Tanana River at Nenana, Alaska	25,600	24,200	* 10,860	124	–58	8,600	5,560	30
08MF005	Fraser River at Hope, British Columbia	83,800	95,720	† 37,430	65	–4	25,400	16,400	30

[1]Adjusted.

[2]Records furnished by Corps of Engineers.

[3]Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y., when adjusted for storage in Lake St. Lawrence.

[4]Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.

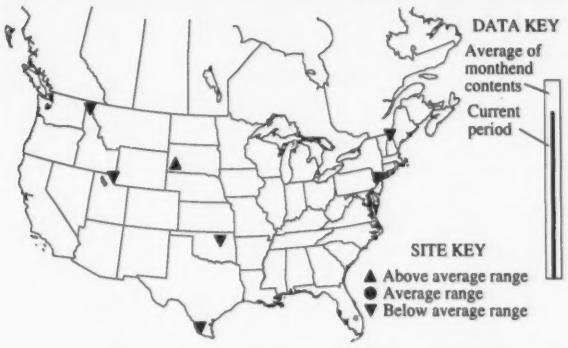
[5]Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

* Above–normal range

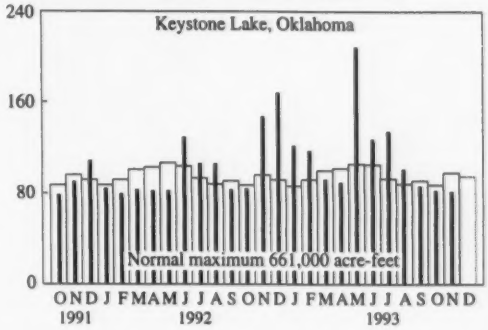
† Below–normal range

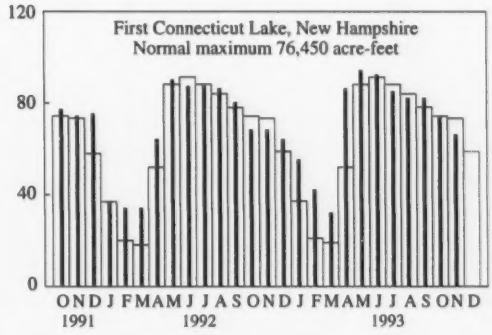
USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF NOVEMBER 1993

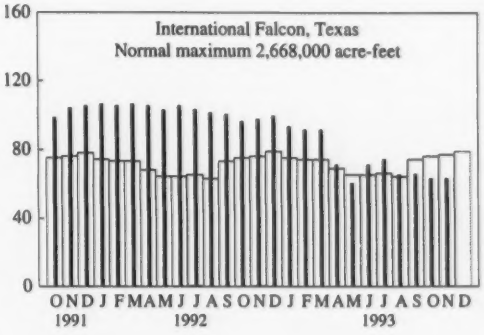
[Contents are expressed in percent of reservoir (system) capacity. The usable capacity of each reservoir (system) is shown in the column headed "Normal maximum" in the table Usable contents of selected reservoir systems.]

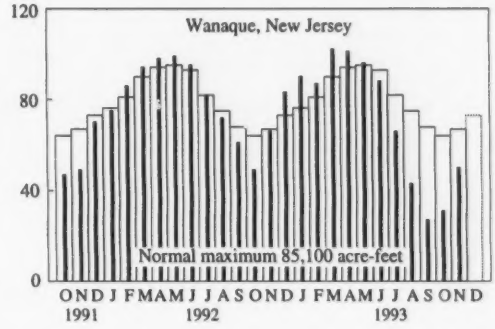


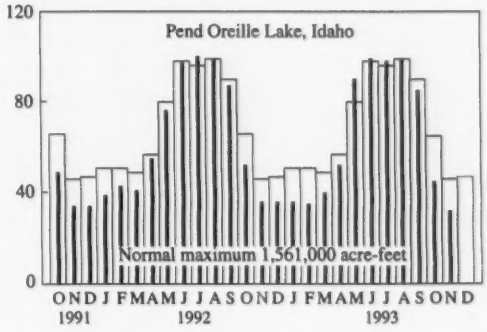
PERCENT OF NORMAL MAXIMUM

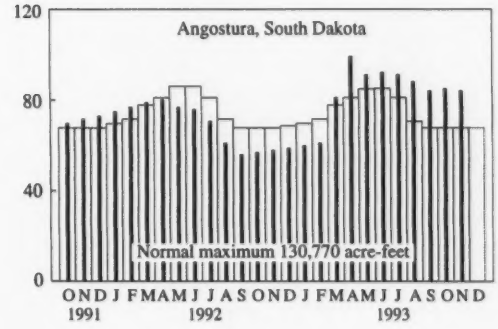


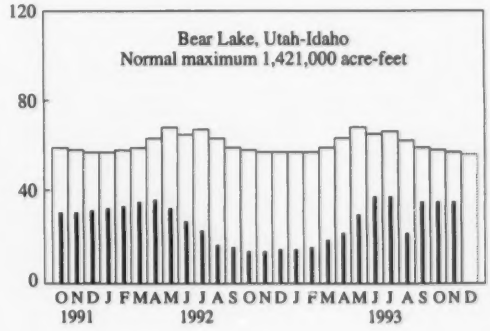












Provisional data; subject to revision

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS NEAR END OF NOVEMBER 1993

[Contents are expressed in percent of reservoir or reservoir system capacity. The usable capacity of each reservoir or reservoir system is shown in the column headed "Normal maximum"]

Reservoir or reservoir system Principal uses: F-Flood control I-Irrigation M-Municipal P-Power R-Recreation W-Industrial	Percent of normal maximum End of November 1993	End of November 1992	Average for end of November	End of October 1993	Normal maximum (acre-feet)[1]
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook reservoirs (P)	* 49	25	40	34	[2]226,300
QUEBEC					
Allard (P)	* 90	91	62	91	280,600
Gouin (P)	* 96	94	69	93	6,954,000
MAINE					
Seven reservoir systems (MP)	* 71	60	58	63	4,146,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	† 66	68	73	74	76,450
Lake Francis (FPR)	* 85	76	78	98	99,310
Lake Winnipesaukee (PR)	* 67	67	61	60	165,700
VERMONT					
Harriman (P)	* 81	65	66	68	116,200
Somerset (P)	* 81	69	72	74	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	† 65	84	73	64	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	56	89	58	49	786,700
Indian Lake (FMP)	* 81	84	61	79	103,300
New York City reservoir system (MW)	† 53	69	71	46	1,680,000
NEW JERSEY					
Wanaque (M)	† 50	66	67	31	85,100
PENNSYLVANIA					
Allegheny (FPR)	32	18	34	32	1,180,000
Pymatuning (FMR)	* 89	92	81	89	188,000
Raystown Lake (FR)	* 72	68	58	66	761,900
Lake Wallenpaupack (PR)	* 79	71	53	66	157,800
MARYLAND					
Baltimore Municipal System (M)	* 97	72	82	91	61,900
NORTH CAROLINA					
Bridgewater (Lake James) (P)	* 91	100	80	91	288,800
Narrows (Badin Lake) (P)	96	100	92	93	128,900
High Rock Lake (P)	51	100	56	50	234,800
SOUTH CAROLINA					
Lake Murray (P)	* 75	89	63	78	1,614,000
Lake Marion and Lake Moultrie (P)	* 80	89	65	80	1,777,000
SOUTH CAROLINA-GEORGIA					
Strom Thurmond Lake (FP)	57	92	52	57	1,730,000
GEORGIA					
Burton Lake (PR)	* 78	92	62	97	104,000
Sinclair (MPR)	* 88	100	76	85	214,000
Lake Sidney Lanier (FMPR)	† 41	68	50	40	1,686,000
ALABAMA					
Lake Martin (P)	* 80	92	64	81	1,375,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	36	41	32	38	2,293,000
Douglas Lake (FPR)	14	40	19	17	1,395,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	39	70	44	39	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	* 44	51	37	47	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	* 51	71	42	53	1,478,000
WISCONSIN					
Chippewa and Flambeau (PR)	* 92	90	77	84	365,000
Wisconsin River (21 reservoirs) (PR)	69	81	67	71	399,000
MINNESOTA					
Mississippi River Headwater System (FMR)	* 35	33	28	42	1,640,000
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	80	59	82	80	22,700,000
SOUTH DAKOTA					
Angostura (I)	* 84	58	68	85	130,770
Belle Fourche (I)	* 63	14	39	63	185,200
Lake Francis Case (FIP)	53	52	53	60	4,589,000
Lake Oahe (FIP)	* 88	65	65	89	22,240,000
Lake Sharpe (FIP)	100	101	98	101	1,697,000
Lewis and Clark Lake (FIP)	† 91	98	101	92	432,000
NEBRASKA					
Lake McConaughy (IP)	72	54	68	71	1,948,000
OKLAHOMA					
Eufaula Lake (FPR)	94	117	93	96	2,378,000
Keystone Lake (FPR)	† 81	147	98	82	661,000
Tenkiller Ferry Lake (FPR)	105	119	101	103	628,200
Lake Altus (FIMR)	* 58	82	48	58	133,000
Lake O'The Cherokees (FPR)	* 95	108	84	91	1,492,000
OKLAHOMA-TEXAS					
Lake Texoma (FMPRW)	97	103	93	98	2,722,000
TEXAS					
Bridgeport (IMW)	* 93	90	51	94	386,400
Canyon Lake (FMR)	* 96	99	80	97	385,600
International Amistad (FIMPW)	88	98	88	88	3,497,000
International Falcon (FIMPW)	† 63	97	77	63	2,668,000
Livingston (IMW)	* 100	102	89	104	1,788,000
Possum Kingdom Lake (IMPRW)	† 82	87	96	83	570,200
Red Bluff (P)	32	49	30	31	307,000
Toledo Bend (P)	† 75	83	81	75	4,472,000
Twin Buttes (FIM)	* 54	77	36	55	177,800
Lake Kemp (IMW)	† 76	86	86	78	268,000
Lake Meredith (FMW)	34	40	38	35	796,900
Lake Travis (FIMPRW)	79	98	79	79	1,144,000
MONTANA					
Canyon Ferry Lake (FIMPR)	89	78	87	91	2,043,000
Fort Peck Lake (FPR)	† 77	58	83	76	18,910,000
Hungry Horse (FIPR)	† 55	46	81	61	3,451,000
WASHINGTON					
Ross (PR)	† 72	63	79	88	1,052,000
Franklin D. Roosevelt Lake (IP)	† 81	92	99	89	5,022,000
Lake Chelan (PR)	65	66	66	80	676,100
Lake Cushman (PR)	† 56	72	80	80	359,500
Lake Merwin (P)	* 98	98	92	106	245,600
IDAHO					
Boise River (4 reservoirs) (FIP)	53	15	49	38	1,235,000
Coeur d'Alene Lake (P)	† 40	53	55	43	238,500
Pend Oreille Lake (FP)	† 32	36	46	45	1,561,000
IDAHO-WYOMING					
Upper Snake River (8 reservoirs) (MP)	* 69	26	53	63	4,401,000
WYOMING					
Boysen (FIP)	* 86	72	79	89	802,000
Buffalo Bill (IP)	* 60	64	45	62	646,600
Keyhole (F)	35	10	39	35	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey reservoirs (I)	43	26	47	42	3,056,000
COLORADO					
John Martin (FIR)	15	6	16	11	364,400
Taylor Park (IR)	* 66	58	55	68	106,200
Colorado-Big Thompson Project (I)	* 72	56	57	72	730,300
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa reservoirs (IFPR)	78	60	76	79	31,620,000
UTAH-IDAHO					
Bear Lake (IPR)	† 36	14	58	36	1,421,000
CALIFORNIA					
Folsom Lake (FIMPR)	44	16	48	48	1,000,000
Hetch Hetchy (MP)	* 77	43	43	83	360,400
Lake Isabella (FIR)	* 43	15	24	44	568,100
Pine Flat Lake (FIR)	35	5	37	35	1,001,000
Clair Engle Lake (Lewiston) (FP)	* 78	27	65	79	2,438,000
Lake Almanor (P)	* 73	67	52	78	1,036,000
Lake Berryessa (FIMRW)	† 47	27	70	47	1,600,000
Millerton Lake (FI)	34	32	39	31	503,200
Shasta Lake (FIPR)	67	41	62	68	4,377,000
CALIFORNIA-NEVADA					
Lake Tahoe (IMPRW)	† 0	0	45	0	744,600
NEVADA					
Rye Patch (I)	† 7	1	44	7	194,300
ARIZONA-NEVADA					
Lake Mead and Lake Mohave (FIMP)	* 81	75	72	81	27,970,000
ARIZONA					
San Carlos (IP)	* 56	57	22	55	935,100
Salt and Verde River System (IMPR)	* 69	68	41	65	2,019,100
NEW MEXICO					
Conchas (FIR)	78	89	82	78	315,700
Elephant Butte and Caballo (FIPR)	* 85	76	39	83	2,394,000

[1] 1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second per day.

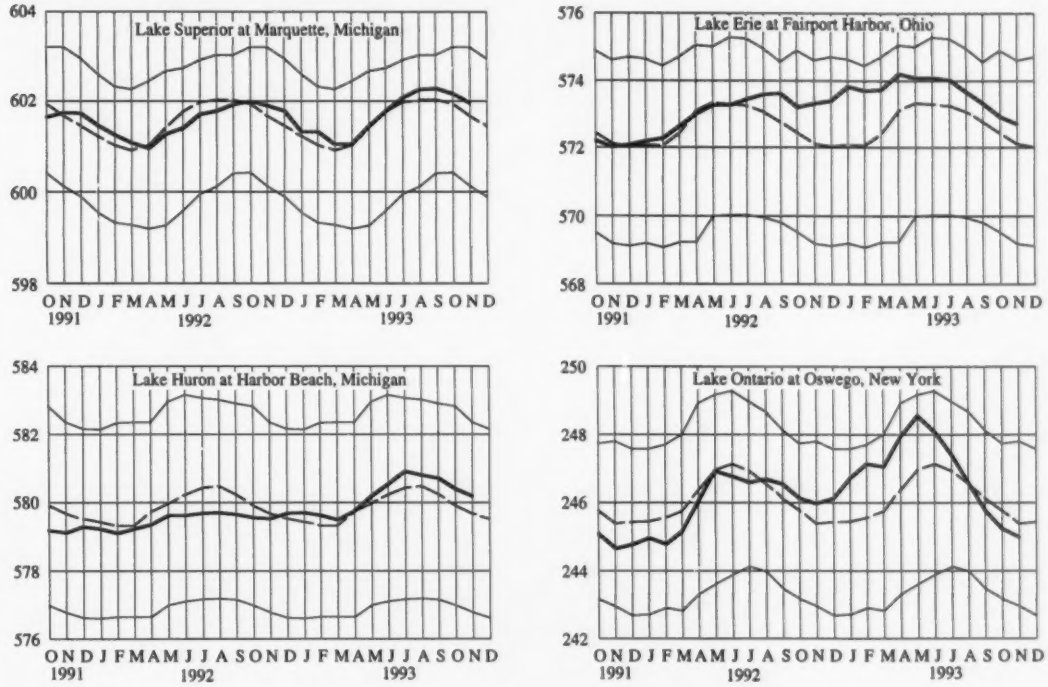
[2] Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

* Above-average range

† Below-average range

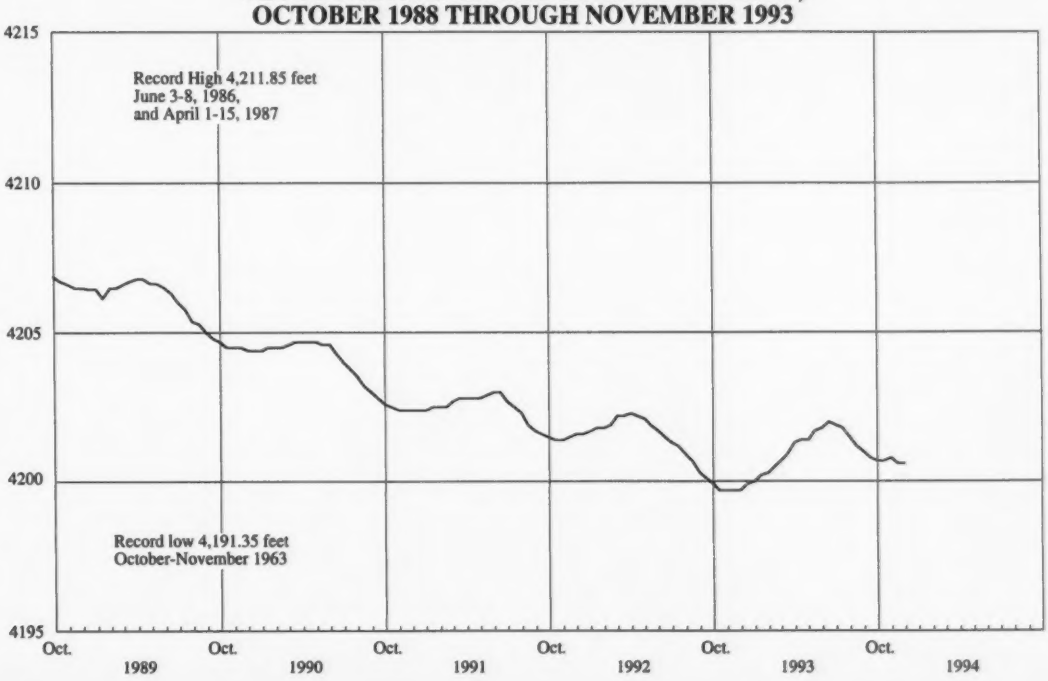
GREAT LAKES ELEVATIONS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period 1961-90. Heavy line indicates mean for current period. Data from National Ocean Service.

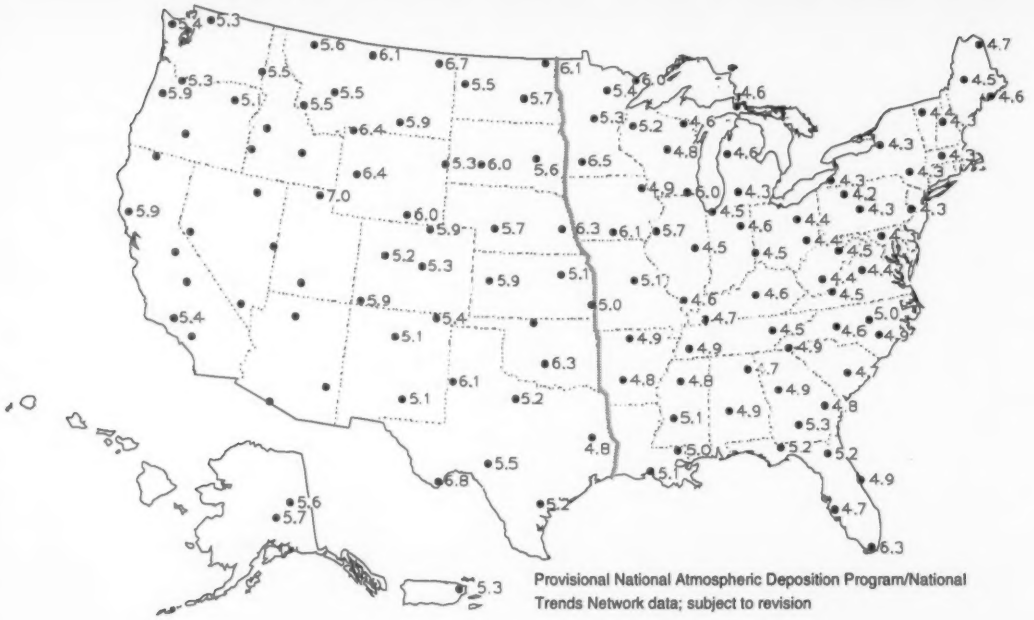


ELEVATION, IN FEET ABOVE NATIONAL GEODETIC VERTICAL DATUM OF 1929

FLUCTUATIONS OF THE GREAT SALT LAKE, OCTOBER 1988 THROUGH NOVEMBER 1993



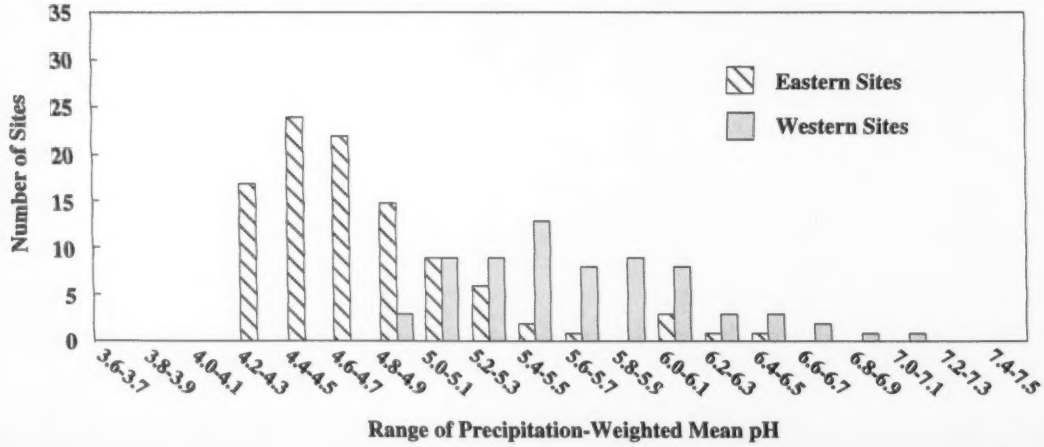
pH of Precipitation for October 25-November 21, 1993



Current pH data shown on the map (• 4.9) are precipitation-weighted means calculated from preliminary laboratory results provided by the NADP/NTN Central Analytical Laboratory at the Illinois State Water Survey and are subject to change. The 127 points (•) shown on this map represent a subset of all sites chosen to provide relatively even geographic spacing. Absence of a pH value at a site indicates either that there was no precipitation or that data for the site did not meet preliminary screening criteria for this provisional report.

A list of the approximately 200 sites comprising the total Network and additional data for the sites are available from the NADP/NTN Coordination Office, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523.

Distribution of precipitation-weighted mean pH for all NADP/NTN sites having one or more weekly samples for October 25-November 21, 1993. The East/West dividing line is at the western borders of Minnesota, Iowa, Missouri, Arkansas, and Louisiana.



NATIONAL WATER CONDITIONS

NOVEMBER 1993

Based on reports from the Canadian and U.S. Field offices; completed April 21, 1994

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Page showing pH of precipitation data furnished by Office of Atmospheric Deposition.

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EXPLANATION OF DATA (Revised April 1994)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 186 index gaging stations—18 in Canada, 166 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1961-90. Shorter reference periods are used for one index station in Utah and both of the Puerto Rico index stations. Streamflow data presented herein are those published in the annual series of U.S. Geological Survey reports titled *Water Resources Data* (State) through the end of the 1992 water year—September 30, 1992. All other data are provisional.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude—the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by weighted averaging of the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile or median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range), 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as: in the ***above-normal range*** if it is greater than the upper quartile, in the ***normal range*** if it is between the upper and lower quartiles, and in the ***below-normal range*** if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as ***seasonal*** if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as ***contraseasonal***. For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. ***Probability of occurrence*** is the chance that a given flood magnitude will be exceeded in any one year. ***Recurrence interval*** is the reciprocal of probability of occurrence and is the average number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. ***Recurrence intervals imply no regularity of occurrence***; a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Dissolved solids and temperature data are given for two stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). ***Dissolved solids*** are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. ***Dissolved-solids discharge*** represents the total daily amount of dissolved minerals carried by the stream. ***Dissolved-solids concentrations*** are generally higher during periods of low streamflow, but the highest dissolved-solids discharges occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

Multiply inch-pound units	By	To obtain SI units
	Length	
inches	2.54×10^{1}	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet	3.048×10^{-1}	meters (m)
miles	1.609×10^{3}	kilometers (km)
	Area	
square miles	2.590×10^{0}	square kilometers (km^2)
	Volume	
acre-feet (acre-feet)	1.233×10^{-3}	cubic hectometers (hm^3)
	1.233×10^{-6}	cubic hectometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	2.832×10^{-2}	cubic meters per second (m^3/s)

*U.S. Government Printing Office: 1994 — 301-071/00002

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